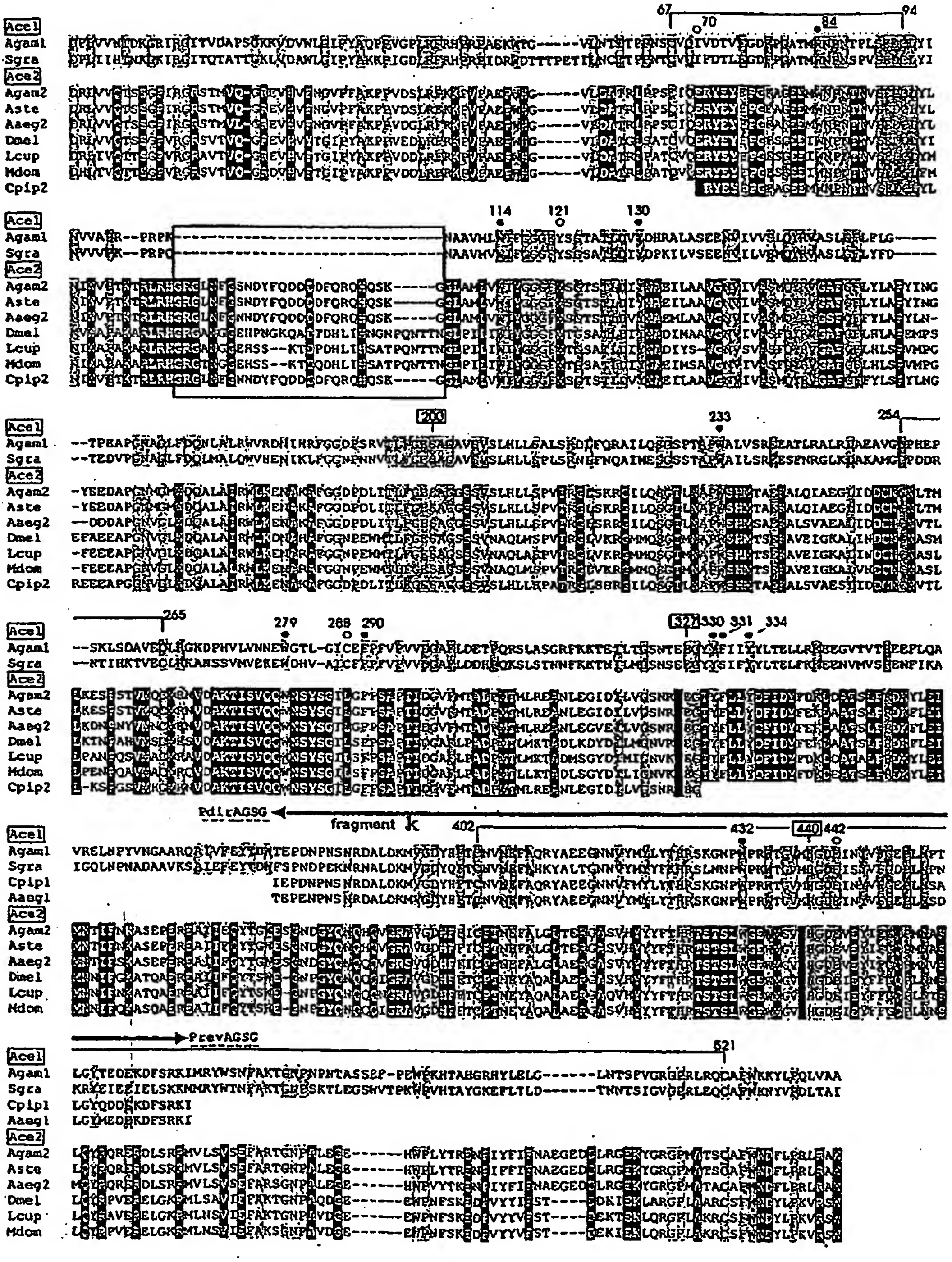
Ace1
Agam1
Sgra
Ace2
Agam2
Aste
Aaeg2
Dmel
Lcup
Mdom
Cpip2
Cpip1
Aaeg1
67
70
84
94
114
121
130
200
233
254
265
279
288
290
327
330
331
334
PdirAGSG
fragment K
402
432
440
442
PrevAGSG
521

FIGURE 1

A

```
          1                                                                                           80
Ae alb    TEPENPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNSDLGY
Ae aeg    TEPENPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNSDLGY
An.alb    TEPDNPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNPTLGY
An.gam    TEPDNPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNPTLGY
An fun    TEPDNPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNPSLGY
An nil    TEPQNPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNPSLGY
An sac    TEPDNPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNPSLGY
An pse    TEPDNPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV YMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNPGLGY
Cx Pip    EEPDNPNSNR DALDKMVGDY HFTCNVNEFA QRYAEEGNNV FMYLYTHRSK GNPWPRWTGV MHGDEINYVF GEPLNSALGY

            81        91
Ae alb    MDDEKDFSRK I
Ae aeg    MEDEKDFSRK I
An alb    TDDEKGFSRK I
An gam    TEDEKDFSRK I
An fun    TEDEKDFSRK I
An nil    TEDEKDFSRK S
An sac    TDDEKDFSRK I
An pse    TEDEKDFSRK I
Cx Pip    DDDEKDFSRK I
```

B

```
                       *         20         *         40         *         60         *         80
Ace1-SLAB     ATGGAACCGGACAACCCGAACAGCAACCGTGACGCGCTGGACAAGATGGTCGGGGATTATCACTTCACCTGCAACGTGAA
Ace1-SR       ATGGAACCGGACAACCCGAACAGCAACCGTGACGCGCTCGACAAGATGGTCGGGGATTATCACTTCACCTGCAACGTGAA

                EcoRI  *        100         *        120         *        140         *        160
Ace1-SLAB     CGAATTCGCCCAGCGGTACGCCGAGGAGGGCAACAACGTGTTCATGTACCTGTACACGCACAGAAGCAAAGGAAATCCCT
Ace1-SR       CGAATTCGCCCAGCGGTACGCCGAGGAGGGCAACAATGTGTTCATGTACCTGTACACGCACAGAAGCAAAGGAAATCCCT

                       *        180         *        200         *        220         *        240
Ace1-SLAB     GGCCGAGGTGGACGGGCGTGATGCACGGCGACGAGATCAACTACGTGTTTGGCGAACCGCTGAACTCGGCCCTCGGCTAC
Ace1-SR       GGCCGAGGTGGACAGGCGTGATGCACGGCGACGAGATCAACTACGTGTTTGGCGAACCGCTGAACTCGGCCCTCGGCTAC

                       *        260         *
Ace1-SLAB     CAGGACGACGAGAAGGACTTTAGCCGGAAAATT
Ace1-SR       CAGGACGACGAGAAGGACTTTAGCCGGAAAATT
```

C

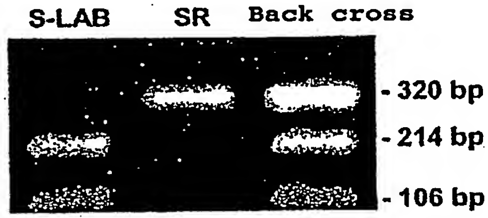

FIGURE 2

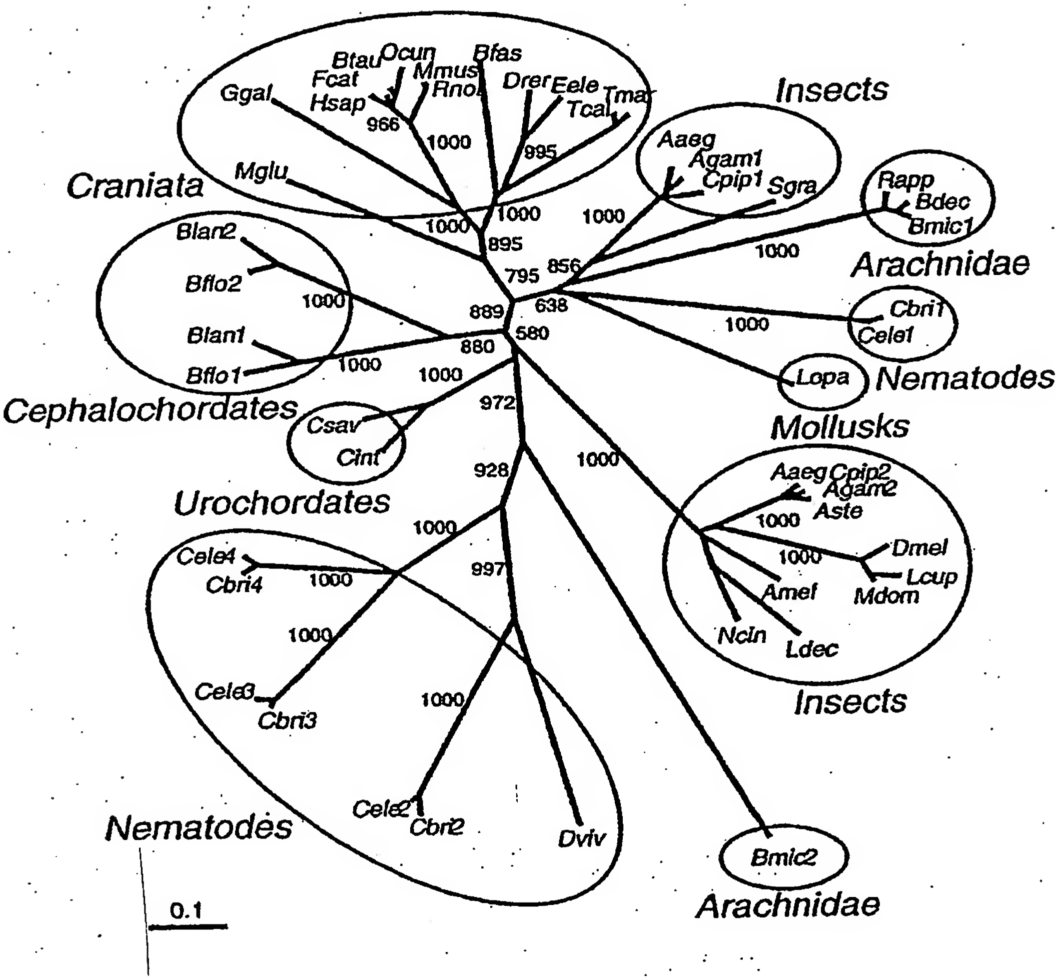
Craniata
Btau
Ocun
Bfas
Fcat
Mmus
Hsap
Rno
Drer
Eele
Tmar
Tcal
Ggal
966
1000
995
Mglu
1000
1000
895
795
Insects
Aaeg
Agam1
Cpip1
Sgra
1000
856
Rapp
Bdec
Bmic1
1000
Arachnidae
Blan2
Bflo2
1000
Blan1
Bflo1
1000
889
880
638
580
Cbri1
Cele1
1000
Lopa
Nematodes
Mollusks
Cephalochordates
1000
972
Csav
Cint
Urochordates
928
1000
Aaeg
Cpip2
Agam2
Aste
1000
1000
Dmel
Lcup
Mdom
Amel
Ncin
Ldec
Insects
1000
Cele4
Cbri4
1000
997
1000
Cele3
Cbri3
1000
Cele2
Cbri2
Dviv
Nematodes
Bmic2
Arachnidae
0.1

FIGURE 3

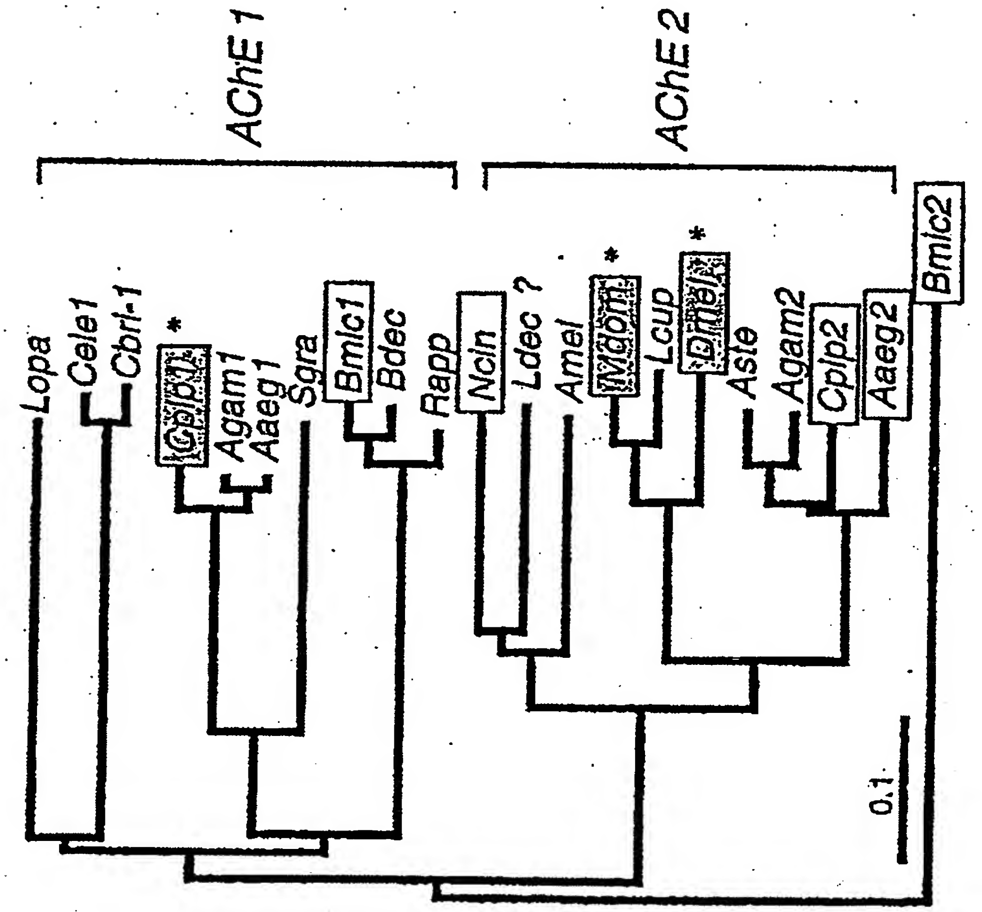
AChE1
AChE2
Lopa
Cele1
Cbrl-1
*
Cplp1
Agam1
Aaeg1
Sgra
Bmlc1
Bdec
Rapp
Ncln
Ldec ?
Amel
*
Mdom
Lcup
*
Dmel
Asle
Agam2
Cplp2
Aaeg2
Bmlc2
0.1

FIGURE 4

10/518072

```
           1                                                                                    80
SR         MEIRGLITRL LGPCHLRHLI LCSLGLYSIL VQSVHCRHHD IGSSVAHQLG SKYSQSSSLS SSSQSSSSLA EEATLNKDSD
S-LAB      MEIRGLITRL LGPCHLRHLI LCSLGLYSIL VQSVHCRHHD IGSSVAHQLG SKYSQSSSLS SSSQSSSSLA EEATLHKDSD

           81                                                                                  160
SR         AEFTPYIGHG DSVRIVDAEL GTLEREHIHS TTTRRRGLTR RESSSDATDS DPLVITTDKG KIRGTTLEAP SGKKVDAWMG
S-LAB      AEFTPYIGHG DSVRIVDAEL GTLEREHIHS TTTRRRGLTR RESSSDATDS DPLVITTDKG KIRGTTLEAP SGKKVDAWMG

           161                                                                                 240
SR         IPYAQPPLGP LRFRHPRPAE RWTGVLNATK PPNSCVQIVD TVFGDFPGAT MWNPNTPLSE DCLYINVVVP RPRPKNAAVM
S-LAB      IPYAQPPLGP LRFRHPRPAE RWTGVLNATK PPNSCVQIVD TVFGDFPGAT MWNPNTPLSE DCLYINVVVP RPRPKNAAVM

           241                                                                                 320
SR         LWIFGGRFYS GTATLDVYDH RTLASEENVI VVSLQYRVAS LGFLFLGTPE APGNAGLFDQ NLALRWVRDN IHRFGGDPSR
S-LAB      LWIFGGGFYS GTATLDVYDH RTLASEENVI VVSLQYRVAS LGFLFLGTPE APGNAGLFDQ NLALRWVRDN IHRFGGDPSR

           321                                                                                 400
SR         VTLFGESAGA VSVSLHLLSA LSRDLFQRAI LQSGSPTAPW ALVSREEATL RALRLAEAVN CPHDATKLSD AVECLRTKDP
S-LAB      VTLFGESAGA VSVSLHLLSA LSRDLFQRAI LQSGSPTAPW ALVSREEATL RALRLAEAVN CPHDATKLSD AVECLRTKDP

           401                                                                                 480
SR         NELVDNEWGT LGICEFPFVP VVDGAFLDET PQRSLASGRF KKTDILTGSN TEEGYYFIIY YLTELLRKEE GVTVTREEFL
S-LAB      NELVDNEWGT LGICEFPFVP VVDGAFLDET PQRSLASGRF KKTDILTGSN TEEGYYFIIY YLTELLRKEE GVTVTREEFL

           481                                                                                 560
SR         QAVRELNPYV NGAARQAIVF EYTDWIEPDN PNSNRDALDK MVGDYHFTCN VNEFAQRYAE EGNNVFMYLY THRSKGNPWP
S-LAB      QAVRELNPYV NGAARQAIVF EYTDWIEPDN PNSNRDALDK MVGDYHFTCN VNEFAQRYAE EGNNVFMYLY THRSKGNPWP

           561                                                                                 640
SR         RWTGVMHGDE INYVFGEPLN SALGYQDDEK DFSRKIMRYW SNFAKTGNPN PSTPSVDLPE WPKHTAHGRH YLELGLNTTF
S-LAB      RWTGVMHGDE INYVFGEPLN SALGYQDDEK DFSRKIMRYW SNFAKTGNPN PSTPSVDLPE WPKHTAHGRH YLELGLNTTF

           641                                                      702
SR         VGRGPRLRQC AFWKKYLPQL VAATSNLQVT PAPSVPCESS STSYRSTLLL IVTLLLVTRF KI
S-LAB      VGRGPRLRQC AFWKKYLPQL VAATSNLQVT PAPSVPCESS STSYRSTLLL IVTLLLVTRF KI
```

Figure 5

```
        1                                                                             80
         M  E  I  R  G  L  I  T  R  L  L  G  P  C  H  L  R  H  L  I  L  C  S  L  G  L  Y
S-Lab   ATGGAGATCCGAGGCCTAATAACCCGATTACTGGGTCCATGTCACCTGCGACATCTGATACTGTGCAGTTTGGGGCTGTA
SR      --------------------------------------------------------------------------------

                                                                                     160
          S  I  L  V  Q  S  V  H  C  R  H  H  D  I  G  S  S  V  A  H  Q  L  G  S  K  Y  S
S-LAB   CTCCATCCTCGTGCAGTCGGTCCATTGCCGGCATCATGACATCGGTAGTTCGGTGGCACACCAGCTAGGATCGAAATACT
SR      --------------------------------------------------------------------------------

                                                                                     240
           Q  S  S  S  L  S  S  S  S  Q  S  S  S  S  L  A  E  E  A  T  L  N  K  D  S  D
S-LAB   CACAATCATCCTCGTTATCGTCATCCTCGCAATCGTCATCGTCGTTAGCTGAAGAGGCCACGCTGAATAAAGATTCAGAT
SR      --------------------------------------------------------------------------------

                                                                                     320
         A  F  F  T  P  Y  I  G  H  G  D  S  V  R  I  V  D  A  E  L  G  T  L  E  R  E  H
S-LAB   GCATTTTTTACACCATATATAGGTCACGGAGATTCTGTTCGAATTGTAGATGCCGAATTAGGTACATTAGAGCGCGAGCA
SR      --------------------------------------------------------------------------------

                                                                                     400
          I  H  S  T  T  T  R  R  R  G  L  T  R  R  E  S  S  S  D  A  T  D  S  D  P  L  V
S-LAB   TATCCATAGCACTACGACCCGGCGGCGTGGCCTGACCCGGAGGGAGTCCAGCTCCGATGCCACCGACTCGGACCCACTGG
SR      --------------------------------------------------------------------------------
                                                                         Primer Ex3dir
                                                                                     480
           I  T  T  D  K  G  K  I  R  G  T  T  L  E  A  P  S  G  K  K  V  D  A  W  M  G
S-LAB   TCATAACGACGGACAAGGGCAAAATCCGTGGAACGACACTGGAAGCGCCTAGTGGAAAGAAGGTGGACGCATGGATGGGC
SR      -A-----------------------------------------------A------------------------------

                                                                                     560
         I  P  Y  A  Q  P  P  L  G  P  L  R  F  R  H  P  R  P  A  E  R  W  T  G  V  L  N
S-LAB   ATTCCGTACGCGCAGCCCCCGCTGGGTCCGCTCCGGTTTCGACATCCGCGACCCGCCGAAAGATGGACCGGTGTGCTGAA
SR      --------------------------------------------------------------------------------

                                                                                     640
          A  T  K  P  P  N  S  C  V  Q  I  V  D  T  V  F  G  D  F  P  G  A  T  M  W  N  P
S-LAB   CGCGACCAAACCGCCCAACTCCTGCGTCCAGATCGTGGACACCGTGTTCGGTGACTTCCCGGGGGCCACCATGTGGAACC
SR      ------------A--------------------------------------------------C--G-------------

                                                                                     720
           N  T  P  L  S  E  D  C  L  Y  I  N  V  V  V  P  R  P  R  P  K  N  A  A  V  M
S-LAB   CGAACACACCGCTCTCGGAGGACTGTCTGTACATCAACGTGGTCGTGCCACGGCCCAGGCCCAAGAATGCCGCCGTCATG
SR      ----------C---------------------------------------A----G-----------------T------

                                                                                     800
         L  W  I  F  G  G  G  F  Y  S  G  T  A  T  L  D  V  Y  D  H  R  T  L  A  S  E  E
S-LAB   CTGTGGATCTTCGGGGGTGGCTTCTACTCCGGGACTGCCACGCTGGACGTGTACGACCATCGGACGCTGGCCTCGGAGGA
SR      -----------T------A-----------------------T-------------T-----------------------
                          S

                                                                                     880
          N  V  I  V  V  S  L  Q  Y  R  V  A  S  L  G  F  L  F  L  G  T  P  E  A  P  G  N
S-LAB   GAACGTGATCGTAGTTTCGCTGCAGTACCGTGTCGCAAGTCTTGGGTTTCTCTTCCTGGGCACACCGGAGGCACCCGGTA
SR      ------------G--------------------------------T-----------------T-----------T----

                                                                                     960
           A  G  L  F  D  Q  N  L  A  L  R  W  V  R  D  N  I  H  R  F  G  G  D  P  S  R
S-LAB   ACGCGGGGCTGTTTGATCAGAACCTGGCACTGAGATGGGTCCGCGACAACATCCACCGGTTCGGCGGTGACCCCTCGCGG
SR      --------------------------------------------------------------------------------
          Primer Ex3rev
                                                                                    1040
         V  T  L  F  G  E  S  A  G  A  V  S  V  S  L  H  L  L  S  A  L  S  R  D  L  F  Q
S-LAB   GTCACACTGTTCGGCGAGAGCGCCGGAGCGGTCTCGGTTTCGCTGCACCTGCTGTCGGCGCTCTCGCGGGACCTGTTCCA
SR      --------------------------------------------------------------------------------
```

Figure 6A

```
                                                                                  1120
        R  A  I  L  Q  S  G  S  P  T  A  P  W  A  L  V  S  R  E  E  A  T  L  R  A  L  R
S-LAB GCGGGCCATCCTCCAGAGTGGCTCCCCGACGGCCCCGTGGGCGCTGGTTTCGCGCGAAGAAGCTACGCTTAGAGCTCTTC
SR    ------------------------------------A-------------------------------------------
                                                                                  1200
         L  A  E  A  V  N  C  P  H  D  A  T  K  L  S  D  A  V  E  C  L  R  T  K  D  P
S-LAB GTCTGGCCGAGGCCGTCAACTGTCCGCACGATGCGACCAAGCTGAGCGATGCCGTCGAATGCCTGCGAACCAAGGATCCG
SR    -------------------------------------------------------------T------------------
                                                                                  1280
       N  E  L  V  D  N  E  W  G  T  L  G  I  C  E  F  P  F  V  P  V  V  D  G  A  F  L
S-LAB AACGAGCTGGTCGACAACGAGTGGGGCACGCTGGGGATCTGCGAGTTTCCGTTCGTTCCGGTTGTGGACGGAGCCTTCCT
SR    -----------------T-----------------------------------------------------T--------
                                                                                  1360
        D  E  T  P  Q  R  S  L  A  S  G  R  F  K  K  T  D  I  L  T  G  S  N  T  E  E  G
S-LAB CGATGAGACACCGCAGCGTTCGTTGGCCAGCGGGCGCTTCAAGAAAACGGACATCCTGACCGGCAGCAACACCGAGGAGG
SR    ---------------------------------T----------------------------------------------
                                                                                  1440
         Y  Y  F  I  I  Y  Y  L  T  E  L  L  R  K  E  E  G  V  T  V  T  R  E  E  F  L
S-LAB GTTACTACTTTATCATTTACTATCTAACCGAACTGCTCAGGAAAGAGGAAGGGGTCACGGTAACACGCGAGGAGTTCCTA
SR    --------------------------------------------------------------------------------
                                                                                  1520
       Q  A  V  R  E  L  N  P  Y  V  N  G  A  A  R  Q  A  I  V  F  E  Y  T  D  W  I  E
S-LAB CAGGCCGTCCGGGAGTTGAATCCGTACGTGAACGGTGCCGCCCGGCAGGCCATCGTGTTCGAGTACACGGACTGGATTGA
SR    -----------------------------------------------------------------------------C--
                                                                                  1600
        P  D  N  P  N  S  N  R  D  A  L  D  K  M  V  G  D  Y  H  F  T  C  N  V  N  E  F
S-LAB ACCGGACAACCCGAACAGCAACCGTGACGCGCTGGACAAGATGGTCGGGGATTATCACTTCACCTGCAACGTGAACGAAT
SR    ---------------------------------C--------------------------------------------G-
                                                                                  1680
         A  Q  R  Y  A  E  E  G  N  N  V  F  M  Y  L  Y  T  H  R  S  K  G  N  P  W  P
S-LAB TCGCCCAGCGGTACGCCGAGGAGGGCAACAACGTGTTCATGTACCTGTACACGCACAGAAGCAAAGGAAATCCCTGGCCG
SR    -------------------------------T------------------------------------------------
                                                                                  1760
       R  W  T  G  V  M  H  G  D  E  I  N  Y  V  F  G  E  P  L  N  S  A  L  G  Y  Q  D
S-LAB AGGTGGACCGGCGTGATGCACGGCGACGAGATCAACTACGTGTTTGGCGAACCGCTGAACTCGGCCCTCGGCTACCAGGA
SR    --------T-----------------------------------------------------------------------
                                                                                  1840
        D  E  K  D  F  S  R  K  I  M  R  Y  W  S  N  F  A  K  T  G  N  P  N  P  S  T  P
S-LAB CGACGAGAAGGACTTTAGCCGGAAAATTATGCGATACTGGTCCAACTTTGCCAAGACTGGCAATCCCAACCCGAGTACGC
SR    ------------------------------------------------------------------A-------------
                                                                                  1920
         S  V  D  L  P  E  W  P  K  H  T  A  H  G  R  H  Y  L  E  L  G  L  N  T  T  F
S-LAB CGAGCGTGGACCTGCCCGAATGGCCCAAGCACACCGCCCACGGACGACACTATCTGGAGCTGGGACTGAACACGACCTTC
SR    --------------------------------------------------------------------------------
                                                                                  2000
       V  G  R  G  P  R  L  R  Q  C  A  F  W  K  K  Y  L  P  Q  L  V  A  A  T  S  N  L
S-LAB GTGGGACGGGGCCCACGATTGCGGCAGTGCGCTTTCTGGAAGAAATATTTGCCGCAACTAGTAGCAGCTACCTCTAACCT
SR    --------------------------------------------------------------------------------
                                                                                  2080
        Q  V  T  P  A  P  S  V  P  C  E  S  S  S  T  S  Y  R  S  T  L  L  L  I  V  T  L
S-LAB CCAAGTAACTCCCGCGCCTAGCGTACCTTGCGAAAGCAGCTCAACATCTTATCGATCCACTCTACTTCTAATAGTCACAC
SR    --------------------------------------------------------------------------------
                               2109
         L  L  V  T  R  F  K  I  *
S-LAB TACTTTTAGTAACGCGGTTCAAGATTTAA
SR    -----------------------------
```

Figure 6B

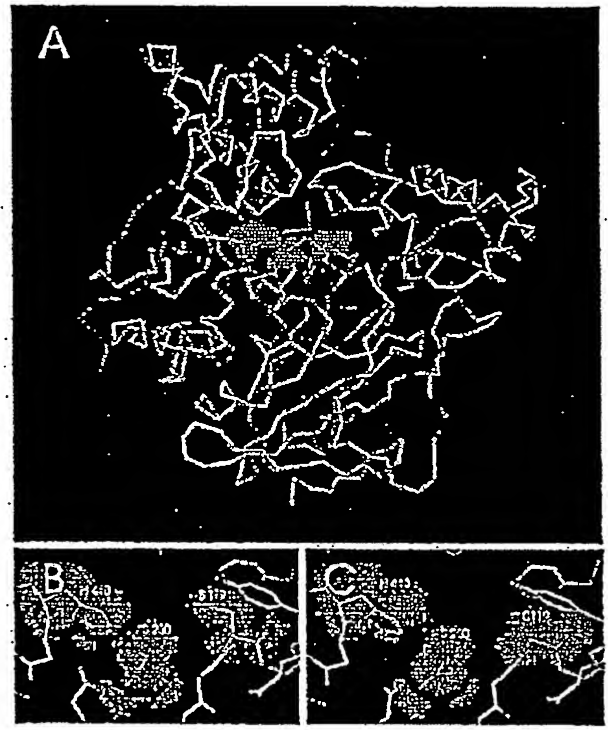

Figure 7

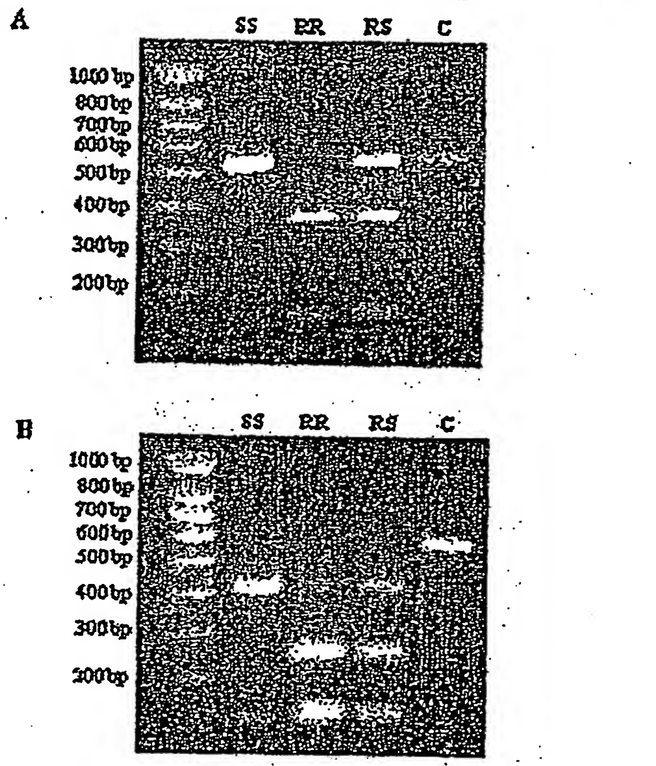
A
SS
RR
RS
C
1000 bp
800 bp
700 bp
600 bp
500 bp
400 bp
300 bp
200 bp
B
SS
RR
RS
C
1000 bp
800 bp
700 bp
600 bp
500 bp
400 bp
300 bp
200 bp

Figure 8

OBLON ET AL (703) 413-3000 10/518072
DOCKET # 263452US SHEET 10 OF 14

```
        1                                                                             80
KISUMU  GAATGCGCATTGTTGCGATAGATTGAATTTCCTTGGTTGTTGTTGTTGGTTTTCTTTTGACATGTTTGTGTGTTGTT
YAO     --------------------------------------------------------------------------------

                                                                                     160
                                                    A  F  F  T  P  Y  I  G  H  G  E  S
KISUMU  TTTTCTTTCTCTCTCTCTCTCT--CTGTGGTTCCAACATTTCAGACGCATTTTTTACACCATATATAGGTCACGGTGAGT
YAO     ----------------------TT--------------------------------------------------------

                                                                                     240
           M  R  I  I  D  A  E  L  G  T  L  E  R  V  H  S  G  A  T  P  R  R  R  G  L  T
KISUMU  CCGTACGAATTATAGATGCCGAGTTGGGCACGCTCGAGCATGTCCACAGTGGAGCAACGCCGCGGCGACGCGGTCTGACG
YAO     ---C---------------------------------------A------------------------------------
           A

                                                                                     320
         R  R  E  S  N  S  D
KISUMU  AGGCGCGAGTCCAACTCGGGTAAGTACGCGATTGGAAGTGGGGGGACGTTTACCCTGCCGTGTACTACAATGCACTTTAC
YAO     -----------A--------------------------------------------A-------------C---------

                                                                                     400
                                A  N  D  N  D  P  L  V  V  N  T  D  K  G  R  I  R  G  I
KISUMU  CCCCACGCACACGCACCGGCAGACGCGAACGACAACGATCCGCTGGTGGTCAACACGGATAAGGGGCGCATCCGCGGCAT
YAO     --------------------------------------------------------------------------------

                                                                                     480
          T  V  D  A  P  S  G  K  K  V  D  V  W  L  G  I  P  Y  A  Q  P  P  V  G  P  L  R
KISUMU  TACGGTCGATGCGCCCAGCGGCAAGAAGGTGGACGTGTGGCTCGGCATTCCCTACGCCCAGCCGCCGGTCGGGCCGTTAC
YAO     ------------C---------------------------------------------------------------C---

                                                                                     560
          F  R  H  P  R  P  A  E  K  W  T  G  V  L  N  T  T  T  P  P  N  S  C  V  Q  I
KISUMU  GGTTCCGTCATCCGCGGCCGGCCGAAAAGTGGACCGGCGTGCTGAACACGACCACACCGCCCAACAGCTGCGTGCAGATC
YAO     --------------------------------------------------------------------------------
                                                                         Primer Ex3AGdir

                                                                                     640
         V  D  T  V  F  G  D  F  P  G  A  T  M  W  N  P  N  T  P  L  S  E  D  C  L  Y  I
KISUMU  GTGGACACCGTGTTCGGCGACTTCCCGGGCGCGACCATGTGGAACCCGAACACGCCCCTGTCCGAGGACTGTCTGTACAT
YAO     --------------------------------------------------------------------------------
        Primer Ex3AGdir
720
          N  V  V  A  P  R  P  R  P  K  N  A  A  V  M  L  W  I  F  G  G  G  F  Y  S  G  T
KISUMU  TAACGTGGTGGCACCGCGACCCCGGCCCAAGAATGCGGCCGTCATGCTGTGGATCTTCGGCGGCGGCTTCTACTCCGGCA
YAO     ------------------G----------------------------------------------A--------------
                                                                         S

                                                                                     800
         A  T  L  D  V  Y  D  H  R  A  L  A  S  E  E  N  V  I  V  V  S  L  Q  Y  R  V
KISUMU  CCGCCACCCTGGACGTGTACGACCACCGGGCGCTTCCGTCGGAGGAGAACGTGATCGTGGTGTCGCTGCAGTACCGCGTG
YAO     --------------------------------------------------------------------------------

                                                                                     880
        A  S  L  G  F  L  F  L  G  T  P  E  A  P  G  N  A  G  L  F  D  Q  N  L  A  L  R
KISUMU  GCCAGTCTGGGCTTCCTGTTTCTCGGCACCCCGGAAGCGCCGGGCAATGCGGGACTGTTCGATCAGAACCTTGCGCTACG
YAO     --------------------------------------------------------------------------------

                                                                                     960
KISUMU  GTAGGTGTCTTTGCATGGGTGAATGAGGGTATAGTATTCTAACGAGGTGCTCTTCTTCCCATCACTTCTTGGGAGTCAGC
YAO     --------------G--T---TC--TA-T---------------------------------------------------

                                                                                    1040
        W  V  R  D  N  I  H  R  F  G  G  D  P  S  R  V  T  L  F  G  E  S  A  G  A  V  S
KISUMU  TGGGTGCGGGACAACATTCACCGGTTCGGTGGTGATCCGTCGCGTGTGACACTGTTCGGCGAGAGTGCCGGTGCCGTCTC
YAO     --------------------------------------------------------------------------------

                                                                                    1120
         V  S  L  H  L  L  S  A  L  S  R  D  L  F  Q  R  A  I  L  Q  S  G  S  P  T  A  P
KISUMU  GGTGTCGCTGCATCTGCTGTCCGCCCTGTCCCGCGATCTGTTCCAGCGGGCCATCCTGCAGAGCGGCTCGCCGACGGCAC
YAO     ---------------------------T----------------------------------------------------
                                             Primer Ex3AGrev

                                                                                    1200
          W  A  L  V  S  R  E  E  A  T  L  R
KISUMU  CGTGGGCATTGGTATCGCGCGAGGAAGCCACGCTAAGGTACGTGCCAGCTGCTGCTTTCCCCAAACCACCAACCCGCGAC
YAO     -----------------------------------------------------------------------------A--
```

Figure 9A

```
                                                                                   1280
                                                           A  L  R  L  A  E  A  V  G  C  P  H
KISUMU  AGCTCACACAACCCTCTTTTCCTTCGCTCTTTTCTCGCTCCAGAGCACTGCGGTTGGCCGAGGCGGTCGGCTGCCCGCAC
YAO     ----------------------G---------------------------------------------------------
                                                                                   1360
         E  P  S  K  L  S  D  A  V  E  C  L  R  G  K  D  P  H  V  L  V  N  N  E  W  G  T
KISUMU  GAACCGAGCAAGCTGAGCGATGCGGTCGAGTGTCTGCGCGGCAAGGATCCGCACGTGCTGGTCAACAACGAGTGGGGCAC
YAO     --------------------------------------------------------------------------------
                                                                                   1440
          L  G  I  C  E  F  P  F  V  P  V  V  D  G  A  F  L  D  E  T  P  Q  R  S  L  A  S
KISUMU  GCTCGGCATTTGCGAGTTCCCGTTCGTGCCGGTGGTCGACGGTGCGTTCCTGGACGAGACGCCGCAGCGTTCGCTCGCCA
YAO     --------------------------------------------------------------------------------
                                                                                   1520
           G  R  F  K  K  T  E  I  L  T  G  S  N  T  E  E  G  Y  Y  F  I  I  Y  Y  L  T
KISUMU  GCGGGCGCTTCAAGAAGACGGAGATCCTCACCGGCAGCAACACGGAGGAGGGCTACTACTTCATCATCTACTACCTGACC
YAO     --------------------------------------------------------------------------------
                                                                                   1600
         E  L  L  R  K  E  E  G  V  T  V  T  R  E  E  F  L  Q  A  V  R  E  L  N  P  Y  V
KISUMU  GAGCTGCTGCGCAAGGAGGAGGGCGTGACCGTGACGCGCGAGGAGTTCCTGCAGGCGGTGCGCGAGCTCAACCCGTACGT
YAO     --------------------------------------------------------------------------------
                                                                                   1680
          N  G  A  A  R  Q  A  I  V  F  E  Y  T  D  W  T  E  P  D  N  P  N  S  N  R  D  A
KISUMU  GAACGGGGCGGCCCGGCAGGCGATCGTGTTCGAGTACACCGACTGGACCGAGCCGGACAACCCGAACAGCAACCGGGACG
YAO     --------------------------------------------------------------------------------
                                                                                   1760
          L  D  K  M  V  G  D  Y  H  F  T  C  N  V  N  E  F  A  Q  R  Y  A  E  E  G  N
KISUMU  CGCTGGACAAGATGGTGGGCGACTATCACTTCACCTGCAACGTGAACGAGTTCGCGCAGCGGTACGCCGAGGAGGGCAAC
YAO     --------------------------------------------------------------------------------
                                                                                   1840
          N  V  Y  M  Y  L  Y  T  H  R  S  K  G  N  P  W  P  R  W  T  G  V  M  H  G  D  E
KISUMU  AACGTCTACATGTATCTGTACACGCACCGCAGCAAAGGCAACCCGTGGCCGCGCTGGACGGGCGTGATGCACGGCGACGA
YAO     --------------------------------------------------------------------------------
                                                                                   1920
          I  N  Y  V  F  G  E  P  L  N  P  T  L  G  Y  T  E  D  E  K  D  F  S  R  K  I  M
KISUMU  GATCAACTACGTGTTCGGCGAACCGCTCAACCCCACCCTCGGCTACACCGAGGACGAGAAAGACTTTAGCCGGAAGATCA
YAO     --------------------------------------------------------------------------------
                                                                                   2000
          R  Y  W  S  N  F  A  K  T  G
KISUMU  TGCGATACTGGTCTAACTTTGCCAAAACCGGGTAAGTGTGTGTGTGTGTGTCAAACAGCAGAGTGTCGATCGCTCT
YAO     -----------------------------------------          ---------A----C-A--A-----
                                                                                   2080
                                             N  P  N  P  N  T  A  S  S  E  F  P  E  W  P  K  H  T
KISUMU  AACGCC------TTCTCTCTTCAACAGCAATCCAAATCCCAACACGGCCAGCAGCGAATTCCCCGAGTGGCCCAAGCACA
YAO     ---A--AGCGTC----------T---------------------A-----------------------------------
                                                                                   2160
          A  H  G  R  H  Y  L  E  L  G  L  N  T  S  F  V  G  R  G  P  R  L  R  Q  C  A
KISUMU  CCGCCCACGGACGGCACTATCTGGAGCTGGGCCTCAACACGTCCTTCGTCGGTCGGGGCCCACGGTTGAGGCAGTGTGCC
YAO     --------------------------------------------------------------------------------
                                                                                   2240
          F| W  K  K  Y  L  P  Q  L  V  A  A  T  S
KISUMU  TTCTGGAAGAAGTACCTTCCCCAGCTAGTTGCAGCTACCTGTAAGTCTCGT-GCAGCGCTTGAAATCCTCTCCCGCATCC
YAO     ---------------------------------------------------A--T--T--A-GA----C--C---T---G---
                                                                                   2320
                                                                               N  L  P  G
KISUMU  TCAACAGGGTCCAGGTTGCAATAACAAATGTATCTCTCTCTCTCACGTCTCTTTTCCCCAAAACAGCGAACCTACCAG
YAO     C--T----------A-A-------------------------     ----A----------------------------
                                                                                   2400
          P| A  P  P  S  E  P  C  E  S  S  A  F  F  Y  R  P  D  L  I  V  L  L  V  S  L
KISUMU  GGCCAGCACCGCCCAGTGAACCGTGCGAAAGCAGCGCATTTTTTTACCGACCTGATCTGATCGTGCTGCTGGTGTCGCTG
YAO     --------------------------------------------------------------------------------
                                                                                   2480
         L  T  A  T  V  R  F  I  Q  *    |
KISUMU  CTTACGGCGACCGTCAGATTCATACAATAATTACTACCCCATCCATGGCCTAGTTCTTTTAAGCTTTAAGATAGTGAGGA
YAO     -------------------------------------------------------G------------------------

KISUMU  ACAAATTTTTCCTAACCAATTTCCCAACCCCCTTTAGAGCAGAACCGAGGGAGAGATAGGACT
YAO     -------------------------   -------------------------------------
```

Figure 9B

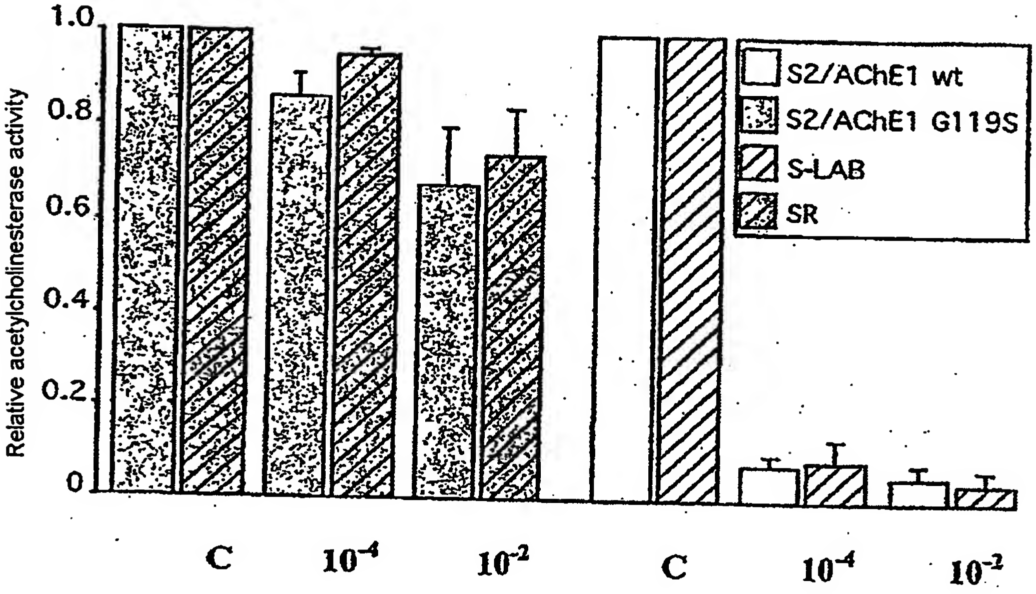
Relative acetylcholinesterase activity
1.0
0.8
0.6
0.4
0.2
0
C
10^{-4}
10^{-2}
C
10^{-4}
10^{-2}
☐ S2/AChE1 wt
▨ S2/AChE1 G119S
▧ S-LAB
▨ SR

Figure 10

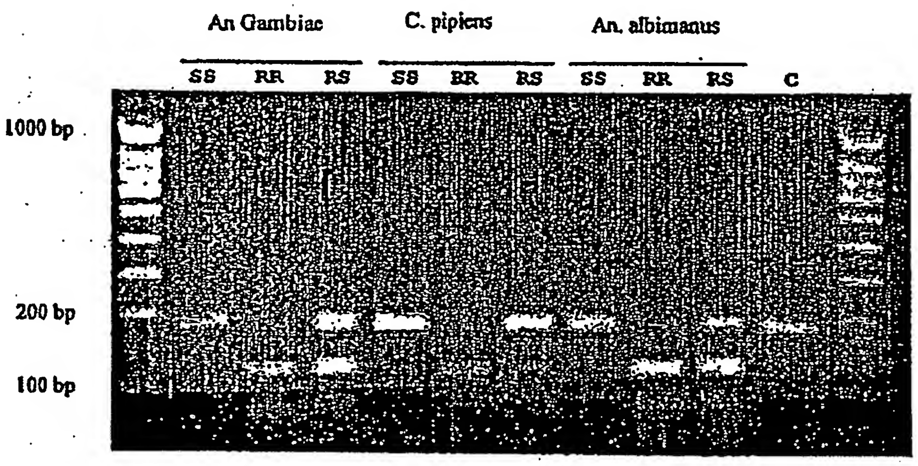

FIGURE 11

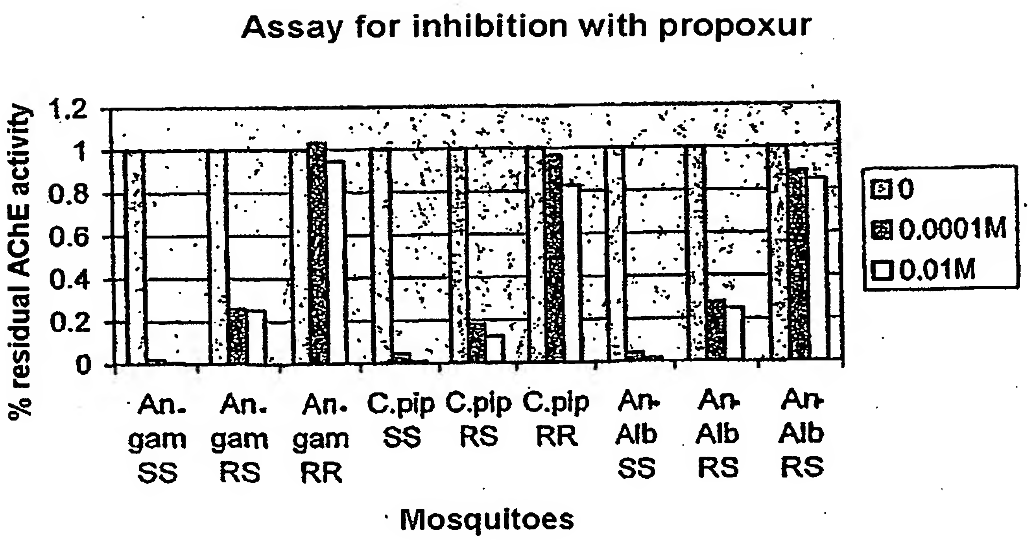

FIGURE 12

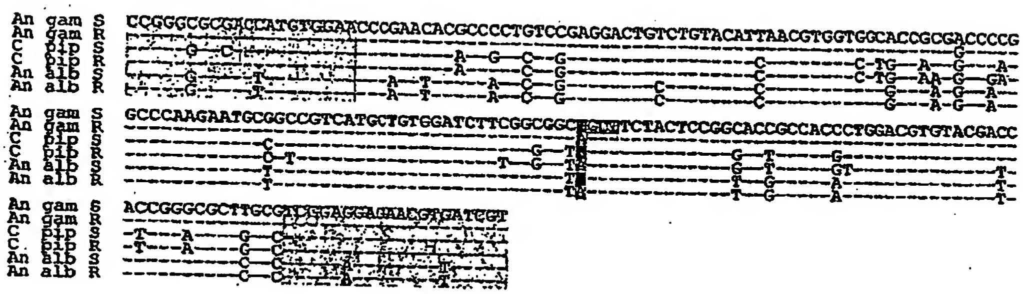

FIGURE 13

>An. albi. "S"
CCGGGGGCGACTATGTGGAACCCAAATACGCCACTCTCGGAGGACTGCCTGTACATCAACGTGGTGGCGCCGAGGCCACGGCCCA
AGAATGCTGCCGTCATGCTGTGGATCTTCGGCGGTGGCTTCTACTCCGGTACGGCCACACTGGACGTGTACGATCACCGGGCGCT
CGCCTCGGAAGAGAACGTTATCGT

>An. albi. "R"
CCGGGGGCGACTATGTGGAACCCAAATACGCCACTCTCGGAGGACTGCCTGTACATCAACGTGGTGGCGCCGAGGCCACGGCCCA
AGAATGCTGCCGTCATGCTGTGGATCTTCGGCGGTAGCTTCTACTCCGGTACGGCCACACTGGACGTGTACGATCACCGGGCGCT
CGCCTCGGAAGAGAACGTTATCGT

FIGURE 14